

# Career Intentions of U.S. Medical Graduates and International Medical Graduates

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**Objective:** This study reports on career intentions of U.S medical graduate (USMG) and international medical graduate (IMG) residents who completed residency training from 2000 to 2003 in California.

**Methods:** A retrospective study of 3,178 responses to the Survey of Residents Completing Training in California.

**Results:** USMGs were 86% and 14% were IMGs. IMG holders of temporary visas had the highest obligation to serve in health professional shortage areas (HPSA) and were also the most likely to serve in HPSAs ( $p=0.012$ ). Underserved residency program location ( $OR=2.7$ ,  $p=0.000$ ), HPSA obligation ( $OR=5.93$ ,  $p=0.001$ ) and postresidency training ( $OR=0.561$ ,  $p=0.048$ ) were independently predictive of practice in underserved location, HPSA or public hospital. In addition, underrepresented minorities, primary care specialty and income were independently predictive of HPSA practice.

**Conclusion:** In California, HPSA obligation, residency training programs characteristics and underrepresented minorities are important predictors of residents choosing to work in underserved areas.

**Key words:** healthcare ■ education ■ healthcare workers ■ healthcare careers

© 2007. From Charles R. Drew University of Medicine & Science/ David Gefen School of Medicine at UCLA, Los Angeles, CA. Send correspondence and reprint requests for *J Natl Med Assoc.* 2007;99:1132-1137 to: Dr. Dotun Ogunyemi, Department of Obstetrics & Gynecology, Cedars Sinai Medical Center, 8635 W. Third St., Room 160W, Los Angeles, CA 90048; phone: (310) 423-1036; fax: (323) 423-0140; e-mail: ogunyemid@cshs.org

## INTRODUCTION

There appears to be a maldistribution of physicians in California, which has shown little evidence for abating in recent years. In 2000, it was estimated that there were about 190 physicians per 100,000 population in California comprising approximately 67 primary care physicians and 122 specialists per 100,000

population in California, indicating that approximately one-third of physicians in California were primary care and the remaining two-thirds were specialists.<sup>1</sup> This total and specialist rates are higher than the recommendation of the Council of Graduate Medical Education (COGME) of 145-185 physicians, with 85-105 specialists and 60-80 primary care physicians per 100,000 population.<sup>2</sup> The Office of Statewide Health Planning & Development divided California state into 487 medical service areas, which are subcounty aggregates of census tracts considered to be service areas for primary care physicians. A health professional shortage area (HPSA) was defined as <1 primary care physicians per 3,000 population.<sup>3</sup> In 1990, there were 177 medical service areas with HPSA designation comprised of 4 million Californians. By December 2000, 153 primary care HPSAs still existed which were predominantly located in Latino and African-American inner-city and rural communities.<sup>3</sup> Many physicians were noted to be concentrated in the metropolitan areas of San Francisco Bay and Los Angeles at the expense of rural and inner-city areas, with Central Valley/Sierra, Inland Empire and South Valley/Sierra having the lowest supplies of physicians.<sup>1</sup> The data also showed that African Americans and Hispanic/Latinos comprised <5% each of the state's physicians even though they comprised 7% and 31% of the states population, respectively.<sup>1</sup> In 2000, approximately 50% of physicians practicing in California were U.S. medical graduates (USMGs) from another state and about 25% were international medical graduates (IMGs). Thus, California relies on other states and on foreign schools to train most of the physicians that practice in the state. This is comparable with the national data, which showed 43% USMG from other states and 24% IMG.<sup>4</sup>

IMGs have been traditionally viewed as our nation's safety-net providers, due to their tendency to work in underserved rural and urban areas. Both at national and state levels, the debate continues over the role of IMGs in the United States. The discussion is centered about two opposing views: 1) seeing IMGs as a "safety net" for underserved patient population or 2) as an exaggeration of an already increasing surplus of physicians.<sup>5</sup> Salsberg et al., reporting from the state of New York,

showed that 52% of New York's resident population was IMGs. This report also showed that IMGs were more likely to train in a primary care specialty and more likely to work HPSA areas, but a high percentage—especially those with temporary visas—planned to subspecialize. This suggested that the contribution of IMGs to primary care in underserved areas may not be as dramatic as previously thought.<sup>6</sup> The objective of this study was to determine if either the California-trained USMG or IMG resident population will show a predisposition to serve the underserved population of California and, secondarily, to assess what factors correlate with residents' intent to serve the underserved. Our hypothesis was that visa status, location and "mission" of training program may contribute to residents choosing to serve in an underserved area on completion of their residency training.

## MATERIALS AND METHODS

The Center for Health Workforce at the University of Albany School of Public Health, State University of New York develops and distributes a survey for residents completing training. The survey provides information on new physicians and outcomes of residency training by specialty. These data could assist the medical education and health workforce community in their efforts to train physicians consistent with the needs of states and the nation. The survey includes questions on demographics, specialty choice and educational experiences, practice characteristics and postresidency plans, obligations and evaluation of job market.

In California, the survey is developed in consultation with the University of California, Office of the Vice President—Health Affairs and is distributed to residents during the last six weeks of training. Since most residents have usually procured their postgraduate positions by this time, it is assumed that the career intentions generally reflect actual career choices.

This is a retrospective study using the information gathered from the survey of residents completing training in teaching hospitals in California between 2000 and 2003. Approval from the Institutional Review Board for the Protection of Human Subjects was obtained.

The data were used to determine the correlations between the desire to practice in HPSA, public hospitals or an underserved area and medical school training, visa obligations, residency characteristics or other demographics.

HPSA was defined as <1 primary care physician per 3,000 population. HPSA obligation was defined as physicians who have a commitment to serve in an HPSA area, usually as a visa requirement or educational loan repayment program. Underserved areas included inner-city urban areas or rural areas. Public hospitals were county or city hospitals/clinics or veterans' hospitals. Primary care specialties were internal medicine, pediatrics and family medicine. Underrepresented minorities (URMs) were those of African-American and Hispanic ethnicity. Underserved residency location was training in a residency program located in inner-city urban or rural areas. County residency programs were at University of Southern California (USC) or Charles R. Drew University (Drew).

Data were analyzed using Chi-squared test, Student's t test, ANOVA and logistic regression analysis, as appropriate.

## RESULTS

There were 3,178 responding residents, of which 3,154 identified the location of their medical school and included 2,722 (86%) USMGs and 432 (14%) IMGs. Of the IMGs, 46(11%) were native born, 306 (71%) were permanent residents/citizens and 80 (18%) were temporary visa holders. Sixty percent of respondents were males and 40% were females. Racial distribution showed that 48.2% were Caucasians, 34.7% were Asians, Hispanics were 6.9%, African Americans 3.7% and others 5.7%.

There were 2,248 respondents from the University of California (UC) affiliated programs (UC–Davis School of Medicine (443), UC–Irvine School of Medicine (327), UC–Los Angeles School of Medicine (549), UC–San Diego School of Medicine (311) and UC–San Francisco School of Medicine (604). There were 930 respondents from 4 non-UC programs (USC Medical Center) (466), Drew (128), Loma Linda University

**Table 1. Career Intentions of graduating residents in California, 2000–2002**

**Percentage of Graduating Residents in Each Group Showing Specific Career Intention**

Career Intentions	USMG (N=2,639)	IMG- Native Born (N=43)	IMG-Citizen/ Permanent Resident (N=293)	IMG- Temp Visa (N=70)	P Value
HPSA	6.60%	8.30%	5.00%	18.60%	0.012
Public hospital	36.20%	38.30%	43%	64.30%	0.000
Underserved area	19.6%	31.40%	37.40%	46.50%	0.000
Primary care	38.50%	41.30%	25.50%	13.60%	0.000
Postresidency training	29.60%	26.10%	24.50%	41.30%	0.26
Practice outside California	23.8%	11.6%	11.6%	40%	0.000

USMG: U.S. medical graduate; IMG: International medical graduate; HPSA: Health professional shortage area

Medical Center (237) and Stanford University Hospital (89). USC and Drew are the county hospitals located in inner-city urban areas, and Drew is a medical education program accredited through UCLA that is the only traditional minority medical school program west of the Mississippi.

One-hundred-forty-eight (4.7%) desired to practice in HPSAs, 481 (15.1%) desired to practice in underserved areas and 801 (25.2%) desired to practice in public hospitals.

Analysis of the career intentions showed similar trends in the desire to practice in HPSAs, underserved areas or public hospitals for USMGs, IMGs-native born, IMG-citizens/permanent residents but significant differences for IMGs-temporary visa holders. For example with intent to practice in HPSAs, there were 6.6% of USMGs, 8.3% of IMGs-native born, 5% of IMGs-citizens/permanent residents versus 18.6% of IMGs-temporary visa holders ( $p=.012$ ). IMGs-temporary visa holders also significantly had the lowest plans to practice in California on completion of their training and the lowest training in primary care while having the highest plans to enter postresidency training (Table 1). IMGs with temporary visas had the highest percentage with an obligation to serve in an HPSA area at 38.0% as compared to 1.1% of USMGs, 2.3% of IMGs-native born and 0.7% of IMGs-citizens/permanent residents ( $p=0.000$ ) (data not shown).

Comparisons between USMGs and IMGs showed that IMGs were older, trained more in a non-UC program with a significant association with the Drew program, were less likely to train in primary care, had less educational debt and more HPSA obligation. IMG had a more negative view of national job market, got more job offers and were more likely to work in underserved and public hospitals but not HPSAs (Table 2). There were

no significant differences between IMGs and USMGs in URM, desire for postresidency training, gender, job difficulty, practice hours, expected income or view of regional market (data not shown).

Analysis of factors associated with desire to practice in HPSA areas showed that residents who chose to practice in HPSA areas were significantly more likely to have temporary visas and HPSA obligation. There were significant associations with URM, specializing in primary care and training in the Drew program. The residents going into HPSA tended to perceive themselves as having more difficulty in getting a job (Table 3). There were no significant associations among HPSA practice and age, gender, postresidency training, educational debts, view of market, job offers, practice hours or income satisfaction.

A logistic regression analysis was done with HPSA as dependent variable to determine factors that were independently predictive of the intent to practice in HPSA area. Variables entered were underserved residency location, URM, primary care specialty, visa status, perceived job difficulty, expected income, citizenship, educational debt, HPSA obligation, educational debt, medical school location and residency program. Only URM ( $OR=2.5$ ,  $p=0.002$ , 95% CI: 0.222–0.702), HPSA obligation ( $OR=62.8$ ,  $p=0.000$ , 95% CI: 19.7–200.2), primary care specialty ( $OR=6.6$ ,  $p=0.000$ , 95% CI: 3.3–13.5), and anticipated income  $> \$200,000$  compared to income  $< \$100,000$  ( $OR=0.342$ ,  $p=0.042$ , 95% CI: 0.109–0.958) were independently predictive of the desire to practice in HPSAs.

Analysis of factors associated with residents who chose to practice in public hospitals also showed significant associations with temporary visas holders (4% vs. 1%,  $p=0.000$ ,  $OR=3.3$ ; 95% CI: 1.8–6.1) and HPSA obligation (4% vs. 1%,  $p=0.000$ ,  $OR=3.9$ ; 95% CI: 2.06–

**Table 2. A comparison of U.S medical graduates versus international medical graduates**

Variable	USMGs (N=2,722)	IMGs (N=432)	P Value (OR)	95% CI
Age (years)	32.3 (0.08)	36.9 (0.3)	0.000	-5.1, -4.1
Non-UC program	728 (26%)	199 (48%)	0.000 (2.6)	2.1, 3.2
Drew program	79 (3%)	54 (13%)	0.000 (1.2)	1.08, 1.16
Underserved program location	366 (13%)	134 (33%)	0.000 (1.3)	1.2, 1.4
Primary care training	1051 (38%)	108 (26%)	0.000 (.8)	0.79, 0.89
HPSA obligation	32 (1%)	32 (8%)	0.000 (1.1)	1.04, 1.1
Educational debt (\$)	81,074 (1,145)	20,360 (2,444)	0.000	-53,557, -67,852
Negative view of national market	141 (6%)	34 (10%)	0.009 (1.7)	1.2, 2.5
Number of job offers	3.9 (0.04)	4.2 (1.1)	0.000	-6.4, -0.2
Work outside California	636 (24%)	61 (16%)	0.000 (1.5)	1.2, 1.9
HPSA practice	123 (7%)	22 (8%)	NS	
Underserved practice	363 (20%)	115 (40%)	0.000 (1.3)	1.2, 1.5
Public hospitals practice	667 (36%)	129 (46%)	0.004 (1.2)	1.2, 2.5
Unsatisfied with income	263 (14%)	52 (18%)	0.08	

( ): SEM, USMG: U.S. medical graduate, IMG: International medical graduate; NS: not significant

7.32); were more likely to be URM (13% vs. 10%,  $p=0.031$ , OR=1.3; 95% CI: 1.03–1.68) and trained in the county residency programs (Drew/USC) (20% vs. 14%,  $p=0.001$ , OR=1.5; 95% CI: 1.2–1.9). They tended to be more dissatisfied with their expected income and with more educational debt. There were no significant differences between residents choosing public hospital practice with others in regards to age, primary care specialty, gender, view of market, job difficulty, practice hours, job offers and choosing to practice in California.

A logistic regression analysis was performed with desire to practice in a public hospital setting as the dependent variable in order to determine independent predictive factors. Variables entered were underserved residency location, URM, educational debt, visa status, anticipated income, primary care specialty, postresidency training, HPSA obligation and residency program. HPSA obligation (OR=3.267,  $p=0.004$ , 95% CI 1.46–7.32), underserved residency location (OR=1.378  $p=0.038$ , 95% CI: 1.02–1.86), anticipated income \$100,001–\$150,000 (OR=1.387  $p=0.043$ , 95% CI: 1.01–1.90), anticipated income \$150,001–\$200,000 (OR=1.72  $p=0.006$ , 95% CI: 1.17–2.52), when compared to income <\$100,000 and postresidency training (OR=0.505,  $p=0.019$ , 95% CI: 0.289–0.895) were independently predictive of the desire to practice in public hospitals.

Analysis was performed to evaluate significant associations of the intent to practice in underserved areas. This also showed the similar trends demonstrating significant correlations with temporary visa holders (4.4% vs. 1.5%,  $p=0.000$ , OR=3; 95% CI: 1.7–5.2); HPSA obligation (6% vs. 1.2%,  $p=0.000$ , OR=5.9; 95% CI: 2.72–8.8); URM (36% vs. 11%,  $p=0.000$ , OR= 4.7; 95% CI: 3.7–6.01); Drew program (7% vs. 4%,  $p=0.004$ , OR=1.9; 95% CI: 1.2–2.91) and less educational debt (\$68,328 vs. \$77,744,  $p=0.01$ ). They tended to more dissatisfied with their expected income and desired more postresidency training. There were no statistical differences among residents choosing underserved location practice with others in regards to age, primary care specialties, gender, market view, job difficulty, practice hours, California stay, job offers or income.

A logistic regression analysis using desire to practice in underserved locations as the dependent variable was performed to ascertain independent predictive factors. Variables entered were underserved residency location, URM, primary care specialty, visa status, expected income, postresidency training, educational debt, satisfaction with income, HPSA obligation and county residency program. Underserved residency program location (OR=4.78,  $p=0.000$ , 95% CI: 3.49–6.54), URM (OR=1.55,  $p=0.039$ , 95% CI: 1.02–2.34), HPSA obligation (OR=6.82,  $p=.000$ , 95% CI: 2.8–16.68) and county residency programs (OR=1.4,  $p=0.044$ , 95% CI: 1.01–1.95) were independently predictive of the desire to practice in an underserved location.

A composite logistic regression analysis was done using as dependent variable all residents who desired to practice in underserved locations, work in public hospitals or practice in HPSAs in order to ascertain independent predictive factors for the composite group. Variables entered were underserved residency location, URM, primary care specialty, visa status, expected income, postresidency training, educational debt, HPSA obligation and county residency program. Underserved residency program location (OR=2.7,  $p=0.000$ , 95% CI: 2–3.64), HPSA obligation (OR=5.93,  $p=.001$ , 95% CI: 2.12–16.54) and postresidency training (OR=0.561,  $p=0.048$ , 95% CI: 0.316–0.996) were independently predictive.

A Pearson correlation was performed to assess if the same residents were choosing HPSA, public hospital settings and underserved location practices. Correlation between public hospitals and HPSA was  $\rho=0.194$ , public hospital and underserved location was  $\rho=0.216$ , HPSA and underserved location was  $\rho=0.264$ . A perfect correlation would have been 1.

## DISCUSSION

The study showed that in California 14% of residents were IMGs, of which 18% were temporary visa holders—which is lower than the reported 52% IMGs and 41% temporary visa holders in New York State.<sup>6</sup> Nationally, it has been reported that almost one in four doctors

**Table 3. Factors associated with residents intent to practice in a physician shortage area**

Variable	HPSA (Yes)	HPSA (No)	P Value (OR)	95% CI
Temporary visa	8 (6%)	38 (2%)	0.011 (2.89)	1.4, 6.1
Drew program	12 (8%)	80 (4%)	0.031 (2.04)	1.14, 3.7
URMs	41 (28%)	194 (10%)	0.000 (2.9)	2.14, 3.8
Underserved program location	42 (28%)	305 (15%)	0.000 (2.21)	-1.5, 3.2
Primary care training	92 (62%)	670 (33%)	0.000 (1.9)	1.6, 2.1
HPSA obligation	32 (22%)	17 (9%)	0.000 (25.8)	14.7, 45.4
Difficulty getting job	41 (28%)	390 (21%)	0.047 (1.3)	1.02-6.1
Expected income	129, 225 (3,918)	141, 988 (1,110)	0.02	-2,081, -4,709
Work outside California	40 (28%)	407 (21%)	0.044 (1.4)	1.03, 1.79

HPSA: Health professional shortage area; URM: Underrepresented minority; IMG: International medical graduate

practicing in the United States is an IMG and one in five IMG physicians is a temporary visa holder.<sup>7</sup> These data suggest that there are regional differences in the distribution of IMGs with more IMGs in states such as Florida, West Virginia, North Dakota and New York than in California.<sup>8</sup>

In the 1980–1990s, the Graduate Medical Education National Advisory Committee (GMENAC), the Council on Graduate Medical Education (COGME) and other analysts forecasted that a growth in the number of physicians would result in a potential surplus of physicians in the United States.<sup>9</sup> It was recommended that there be a limit in the number of medical school positions and a restriction in the influx of IMGs. However, trends in the physician workforce from 1980–2000 showed that the growth has not led to a surplus of physicians.<sup>9</sup> Using planning models based on economic and demographic trends, many analysts, including COGME,<sup>10</sup> Centers for Medicare & Medicaid Services (CMS)<sup>10</sup> and Cooper projected that by the years 2020–2025 there will be 200,000 too few physicians, resulting in a 20% gap in required healthcare coverage.<sup>10</sup>

A “quick” alternative to fill this gap in U.S. healthcare is to increase the number of foreign IMGs. For example, Baer et al. estimated that if there were no IMGs, one of every five adequately served rural or nonmetropolitan counties would become an HPSA with <3,000:1 physician ratio.<sup>8</sup> To this end, Congress expanded the Conrad program, which was created in 1994 to allow each state to request 20 waivers but was increased to 30 waivers per state in 2002. In return for a commitment to serve three years in an HPSA, physicians are granted waivers of the temporary visa rule that would have required the IMG to return to their country of origin for a minimum of two years before becoming eligible to return to the United States.<sup>7</sup> Before the events of September 11, 2001, the U.S. Department of Agriculture (USDA) and Appalachian regional commission were also primary waiver applicants. Because of U.S. immigration policy changes as of 2002, the U.S. Department of Health and Human Services has taken over the USDA role. However, the waiver program does not guarantee the retention of the physician in the HPSA. The results of our study showed that IMGs are less likely to perform primary care and are more likely to seek postresidency training, while HPSA obligation but not IMG status was the independent predictor of HPSA service. This suggests that IMGs may be a short-term—but are not likely to be a long-term—solution for maldistribution of physicians. This is in support of Pathman et al., who showed no difference in retention between HPSA and non-HPSA physicians, including IMGs, and concluded that recruitment is likely to be the principal dynamic underlying local rural shortages.<sup>11</sup> A continuous reliance on poor countries to supply the United States with trained physicians creates an ethical issue. This recruitment by wealthy coun-

tries of health personnel from developing countries is threatening the viability of crucial programs, especially sub-Saharan Africa.<sup>12</sup> This is devastating to underdeveloped countries because these physicians are usually the best and the brightest of their country and are critically needed to provide medical care in their own countries.<sup>13</sup> Thus, a framework for less dependence on IMGs is preferable, and measures to reverse this trend have been postulated.<sup>14</sup>

From 1980–2000, there was a 61% increase in physicians in nonmetropolitan areas, but there was a larger increase of 74% in metropolitan areas, suggesting a “trickle down” effect.<sup>9</sup> URM enrollment in medical colleges between 1979–1980 and 1990–2000 grew from 8% of all enrollees to about 12%, but since 1996–1997 has declined slightly. This recent decline in URMs has led to a call to address the lack of diversity in the physician workplace. Because of feasibility, rather than building new medical schools, one of the propositions suggested is to expand existing medical schools.<sup>10</sup> The results of our study showing that URMs were independently predictive of both HPSA and underserved location practice may be useful in medical school expansion planning. Medical education strategies may include developing medical school satellites that have a mission to train medical students who are familiar and interested in underserved healthcare. Outreach programs to improve the opportunity of URMs’ enrollment in medical schools are required. The admission process of the Drew medical school program highlights the “underserved mission” of the potential medical school candidate as an important criterion for admission. Thus, part of the strategy may be to select medical students with a predilection to serving the underserved.

Another strategy could be to develop new or expand residency programs in underserved areas. Residency programs in nonindigent areas may also develop satellite programs in rural areas. Public enterprises that support residency programs in underserved areas have been cutting back because of issues with funding. COGME has proposed that more residency positions are required. Since Medicare supports the number of residency positions, there has been a lot of controversy whether GME should be a public responsibility or borne by hospitals, medical schools or residents themselves.<sup>10</sup>

Another mechanism to replace IMGs is to expand the National Service Corps (NHSC).<sup>8</sup> Currently, the NHSC provides scholarships to medical students or pays educational loans for graduating residents in return for a commitment to serve in HPSA for an equivalent number of years. This program introduces physicians to HPSA with the hope that some of them may be retained. This is an expensive program, and it is probable that the same purpose can be achieved by training residents in similar settings. This is supported by the findings from this study, with USC/Drew residents opting more for

HPSA locations. Policies geared towards developing and strengthening programs such as the Drew and USC programs may play a significant role and provide a long-term solution.

The limitations of this study include recall bias as with any survey study. Only residents in teaching programs in California were studied; the survey was non-random and self-selected; therefore, the results may not be generalizable to other regions and nonteaching programs. We also did not review the characteristics of residents not completing the survey. Sample size tended to be small in some cases on stratification.

In conclusion, the findings of this study suggest that there are regional differences in USMG and IMG distribution. HPSA obligation, URM and characteristics of residency training programs are important predictors of residents choosing to work in underserved areas. These factors could be used in developing strategies to reduce the maldistribution of physician resources.

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